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sees for the salvation of the Spanish people is in education. This everybody will concede, and he himself acknowledges that much has been done lately in that direction. But such attempts require time, and there is no reason to despair of ultimate success because a few decades have not yet placed Spain, in this respect, on a level with other countries. The disheartening pessimism pervading the whole book may perhaps be partly explained by Spanish lack of sympathy for France, of which the author complains, although recognizing that the Spanish people are not wholly unjustified in their attitude.

AD. F. BANDELIER.

POLAR

Deutsche Südpolar-Expedition 1901-03 (Drygalski). Band 3 und 4:

Meteorologie. Vol. 1, 1. Hälfte, No. 1: Meteorologische Ergebnisse der Winterstation des *Gauss*. Von W. Meinardus, pp. 1-126; No. 2, pp. 127-339. 2. Hälfte, No. 1: Das Beobachtungsmaterial und seine Verwertung nebst Erläuterungen zum meteorologischen Atlas. Von W. Meinardus und L. Mecking. Die Luftdruckverhältnisse und ihre klimatischen Folgen in der Atlantisch-Pazifischen Zone südlich von 30° S. Br. 129 pp. Vol. 2, No. 1: Meteorologische Ergebnisse der Winterstation des *Gauss* 1902-03. (Tabellen). Von W. Meinardus. pp. 1-123. No. 2: Meteorologische Ergebnisse der Kerguelen-Station 1902-03 (Tabellen), pp. 127-242. No. 3: Meteorologische Ergebnisse der Seefahrt des *Gauss* 1901-03 und Ergebnisse der Luftdruckbeobachtungen der Internationalen Meteorologischen Kooperation 1901-04 (Tabellen), pp. 245-452. 1. Atlas Meteorologie, No. 1: Mittlere Isobarenkarten der höheren südlichen Breiten von Oktober 1901 bis März 1904. Diagrams and maps. G. Reimer, Berlin, 1909, 1911, 1913. 14 x 11½.

The memoir of W. Meinardus is an elaborate discussion of the meteorological observations made by the German Antarctic Expedition. Numerous comparisons with observations made by other South Polar expeditions, and the great care with which all details were studied, led Meinardus to many interesting results. A simple enumeration of the problems discussed would occupy many pages. Meinardus has treated his subject with a master hand. Only in a few instances does one feel inclined to criticise his statements. An interesting part of the report is Meinardus's interpretation of the general atmospheric circulation in the South Polar regions.

The memoir of L. Mecking deals with the distribution of atmospheric pressure south of 30° S. and the influence of seasonal barometric changes upon the Antarctic meteorological phenomena. The material upon which Mecking's discussion is based was gathered by international cooperation during the years 1901-1904. Those who attended the Geographical Congress of Berlin in 1899 and remember the discussions and especially Sir Clements Markham's speech, will understand why this "international cooperation" was predestined to be unsatisfactory.

G. Neumayer, who played such a predominant rôle in the organization of the famous polar cooperation of 1882-83, after having worked for years in favor of a German Antarctic Expedition, naturally wished, first of all, for a scientifically important and a geographically successful "German" expedition.

In Sir Clement's mind the "English" expedition had to solve all the problems and he simply condescended therefore to have the South Polar regions divided into two spheres of action: the British and the German. It was by pure courtesy that other expeditions, the Bruce, the Charcot and the Nordenskjöld, had been admitted to cooperate. Such a state of mind could evidently lead only to some misunderstandings, of which whoever is accustomed to read between the lines will find a few words of explanation on p. 13 of the report of Meinardus and Mecking.

In fact, it is only now that one can show, with the aid of the daily maps published by the Royal Society and the monthly maps published by Mecking, how much more could easily have been gained if extensive international cooperation, similar to the Arctic cooperation of 1882-83, had been attempted.

In preparing maps of atmospheric pressure for Oct., 1900, to March, 1904, Mecking introduced principally observations made on board ships. He disposed of approximately 600,000 individual observations. Then, of course, the observations made in Argentina, Chile, Cape Colony, Australia and New Zealand as well as the simultaneous observations of the German Antarctic Expedition were utilized. He divided the observations made at sea into quadrangles and deduced the monthly means. In most cases his isobars do not go farther than 50°S., except south of Cape Horn where the necessary connection with the data of the Antarctic stations could easily be obtained. The immediate result of this closer connection was the discovery of two important centers of action of atmospheric circulation, situated one over Belgica Sea, the other over Weddell Sea. From the discussion it is evident that these centers of action play as important a rôle in Antarctic and South American meteorology as the Icelandic and Northern Pacific centers of action upon the weather conditions of North America and Western Europe.

Mecking's discussion is most suggestive and the principal conclusion to be drawn from his very minute and far-reaching study is certainly that we can not be satisfied with such imperfect polar cooperative work as that done during 1901-1904. Meinardus and Mecking, in this monumental meteorological work, have not restricted themselves to well-established facts, but have had the courage to advance into the field of working hypotheses, opening at the same time the way to new researches and to new discoveries.

HENRYK ARCTOWSKI.

THE WORLD AND PARTS OF IT

In der Tropenwelt. Von Dr. Carl Holtermann. v and 210 pp. Ills., index. W. Engelmann, Leipzig, 1912. Mk. 5.80. 9½ x 6½.

This book treats, very adequately for the general reader, the most representative features of tropical vegetation and the conditions under which the floras develop. In the section on the mangrove, for example, the influence of tropical sea water upon the development of this form of vegetation is sketched. The epiphytes, palms, desert plants, tropical alpine growths, tropical fruits, condiments, tea, coffee, rice, opium and hashish are most prominent among the plants discussed.

PHYSICAL GEOGRAPHY

Zur Geschichte und Theorie des Vulkanismus. Von Dr. Karl Schneider. 113 pp. J. G. Calve, Prag, 1908. 10 x 7.

A good reference work on the history of volcanism. In the first part the author characterizes the theories held by various scientists: Varenius, Kircher, v. Buch, v. Humboldt, Poulett-Scope, Lyell, Naumann, Suess, Branco, Geikie, Stübel, and others; in the second he develops his own opinions on the subject. Taking the interior of the earth as a solid but plastic mass, which a lessening of pressure may change into a liquid or gaseous condition, every disturbance of the equilibrium subsequent to variations of the density of the crust or of the intensity of gravity in the latter must produce a readjustment of the masses which allows the magma to penetrate to the surface. Hence volcanism always appears in connection with tectonic changes, but neither as the cause nor the effect of them, and is most frequent between the tropics because there the centrifugal tendency of the magma is strengthened by that of the equatorial parts of the globe.

Three phases can be distinguished in the character of the eruptions of any volcanic region, which, while sometimes overlapping, regularly succeed one another: the ejection of lava, of ashes (tufa), and of gas. Illustrating these phases by means of examples from Iceland, Italy and the central plateau of France, the author shows that in our present geological period the second phase predominates, with a few relapses into the first (Iceland, Hawaii) and some anticipations of the third (Mt. Pelé). These changes of volcanic intensity are due to the nutation of the earth's axis which disturbs the equilibrium of the masses both in the interior and the crust.

M. K. GENTHE..